



## **Mixed matrix nanoporous carbon membranes**

**Description of Technology:** The invention concerns nanoporous carbon membranes which have been synthesized by pyrolysis of selected polymers on porous substrates to produce thin mixed matrix carbon film with pores for separation of small molecules.

### **Patent Listing:**

1. **US Patent No. 6,740,143**, Issued on May 25, 2004, "Mixed matrix nanoporous carbon membranes"  
<http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetacgi%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=6,740,143.PN.&OS=PN/6,740,143&RS=PN/6,740,143>

**Market Potential:** Applicants describe alternative methods for preparing carbon molecular sieve layers on a stainless steel support. A protocol for increasing flux was followed by including additives such as inorganic oxides like titanium dioxide (TiO<sub>2</sub>), small pore high silica zeolite like SSZ-13, and polyethylene glycol (PEG) in the carbon film. Also, a protocol of pre-pyrolysis of the initial coatings in an inert environment at 800 K followed by heat treatment at lower temperatures 723 K and 650 K led to membranes with higher fluxes than previously reported. Initial coatings were also heat treated at lower temperature 423 K followed by heat treatment at 723 K after the final coatings were deposited as a means to more rapid membrane manufacturing. Furthermore, pyrolysis in the presence of a hydrogen atmosphere, also provides for high small molecule fluxes.

### **Benefits:**

- Process produces high small molecule fluxes

### **Applications:**

- Thin mixed matrix carbon film

### **Contact:**

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